TRACVISION®
BY KVH INDUSTRIES

TracVision M9
Standard Configuration

TracVision M9 User's Guide

TracVision® M9 Standard Configuration with Master Control Unit User's Guide Addendum

(ECO #8127)

The following change applies to Revision C of the TracVision M9 Standard Configuration with Master Control Unit User's Guide (KVH Part #54-0420).

Programming User-defined Satellites

Step 5 on page 56 shows the incorrect @SATCONFIG command; the satellite table field is omitted.

The correct @SATCONFIG command and field values are shown below.

5. Type the following **@SATCONFIG** command then press Enter:

@SATCONFIG,*X*,*D*,*E*,*F*,*G*,*H*,*I*,*J*,*K*

Field	Description
X	User-defined satellite stored in antenna library (User1 = User-defined Satellite 1 or User2 = User-defined Satellite 2)
D	**Satellite table # (98 = User1; 99 = User2)**
E	Frequency, MHz (00000 or 10700-12750)
F	Symbol rate, kilosymbols per second (10000-45000)
G	FEC code (12, 23, 34, 56, 67, or 78)
H	Network ID, hexadecimal (0x####)
I	Polarization (V = vertical; H = horizontal; R = right; L = left)
J	LNB down conversion frequency (U = USA [LO=11250 MHz]; L = low [LO=9750 MHz]; H = high [LO=10600 MHz]; G = Latin America [LO=10500 MHz]; S = Sinosat [LO=11300 MHz])
K	Decoding type (2 = DSS, 3 = DVB)

TracVision M9

Standard Configuration with Master Control Unit (MCU)

User's Guide

This user's guide provides all of the basic information you need to operate, set up, and troubleshoot the TracVision M9 satellite TV antenna system. For detailed installation information, please refer to the *TracVision M9 Installation Guide*.

Please direct questions, comments, or suggestions to:

KVH Industries, Inc.
50 Enterprise Center
Middletown, RI 02842-5279 USA
Tel: +1 401 847-3327
Fax: +1 401 849-0045
E-mail: info@kvh.com
Internet: www.kvh.com

KVH Europe A/S
Kokkedal Industripark 2B
2980 Kokkedal, Denmark
Tel: +45 45 160 180
Fax: +45 45 160 181
E-mail: info@kvh.dk
Internet: www.kvh.com

KVH Part # 54-0420 Rev. C
© 2007, KVH Industries, Inc., All rights reserved.
U.S. Patents Pending

TracVision and KVH are registered trademarks of KVH Industries, Inc.

The unique light-colored dome with dark contrasting base is a registered trademark of KVH Industries, Inc.

DVB (Digital Video Broadcasting) is a registered trademark of the DVB Project.

DIRECTV is an official trademark of DIRECTV, Inc.

DISH Network is an official trademark of EchoStar Communications Corporation.

ExpressVu is a property of Bell ExpressVu, a wholly owned subsidiary of Bell Satellite Services.

All other trademarks are the property of their respective owners.

Table of Contents

1 Introduction

Using this Manual 3
System Overview 6
Circular and Linear Versions 9

2 Operation

Receiving Satellite TV Signals 13
Turning the System On/Off 14
Changing Channels and Switching Between Satellites 15
Product Care 17

3 Settings

Changing the Sleep Mode Setting 21
Changing the Instant On Setting 22
Setting the MCU to Track Different Satellites 23
Adjusting Display Brightness 26
Restarting the Antenna 27
Manually Setting Latitude and Longitude 28

4 Troubleshooting

Four Simple Checks 31
Troubleshooting Matrix 32
Causes and Remedies for Operational Issues 33
Technical Support 37
Field Replaceable Units 38

A Advanced Settings and Functions

Manually Controlling the Antenna.....43

Updating Satellite Frequency Data 44

Configuring Satellite Settings 46

Displaying Software Version Information.....48

Displaying the Antenna Serial Number 49

Other Advanced Settings 50

B Programming User-defined Satellites

Connect a PC to the Main Flash Port.....53

Programming Your User-defined Satellite(s) 55

C TracVision M9 Wiring Diagrams

TracVision M9 Wiring Diagram for One or Two Receivers 63

TracVision M9 Wiring Diagram for Three or Four Receivers (Circular Version Only) 64

TracVision M9 Wiring Diagram for Three or Four Receivers (Linear Version Only).....65

D Recalibration

Recalibrating the System.....69

1. Introduction

This chapter provides a basic overview of this manual and your TracVision system.

Contents

Using this Manual 3
System Overview 6
Circular and Linear Versions 9

1

Using this Manual

This manual provides complete operation, setup, and troubleshooting information for your TracVision system, as well as wiring diagrams for various TracVision M9 configurations.

Who Should Use This Manual

The **user** should refer to the "Operation" chapter to learn how to operate the system.

The **user**, **installer**, or **servicing technician** should refer to the "Settings" chapter for information on configuring the system and the "Wiring Diagram" appendices for information on connecting additional receivers.

The **installer** or **servicing technician** should refer to the "Advanced Settings and Functions" appendix for information on advanced setting and operational procedures.

The **user** and/or **servicing technician** should refer to the "Troubleshooting" chapter to help identify the cause of a system problem.

Notifications Used in this Manual

This manual uses the following notification to call attention to important information:

IMPORTANT!

This is an important notice. Be sure to read these carefully to ensure proper operation and configuration of your TracVision system.

NOTE: *This is a Note. Notes contain information about system settings.*

TIP: *This is a Tip. These contain helpful information, allowing you to get the most out of your TracVision system.*

Typographical Conventions

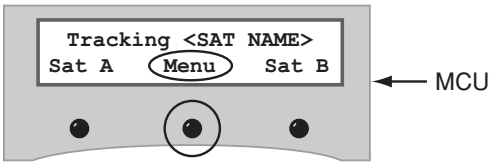
This manual uses the following typographical conventions:

Text Example	Description
`<Sat Name>` `###`	Text in brackets or the pound sign (#) indicates a variable portion of the MCU display
HALT	Bold text in capital letters indicates a command to be entered via a PC
X	Bold text in *italicized* capital letters indicates a variable portion of a command to be entered via a PC
"Turning the System On/ Off" on page 14	Cross-reference to another chapter in the manual or to a website

MCU (Master Control Unit) Interface Conventions

When instructions indicate to select a specific MCU menu option, press the MCU button located directly beneath the menu option.

Figure 1-1 Example of MCU Menu Option and Corresponding Button.



Related Documentation

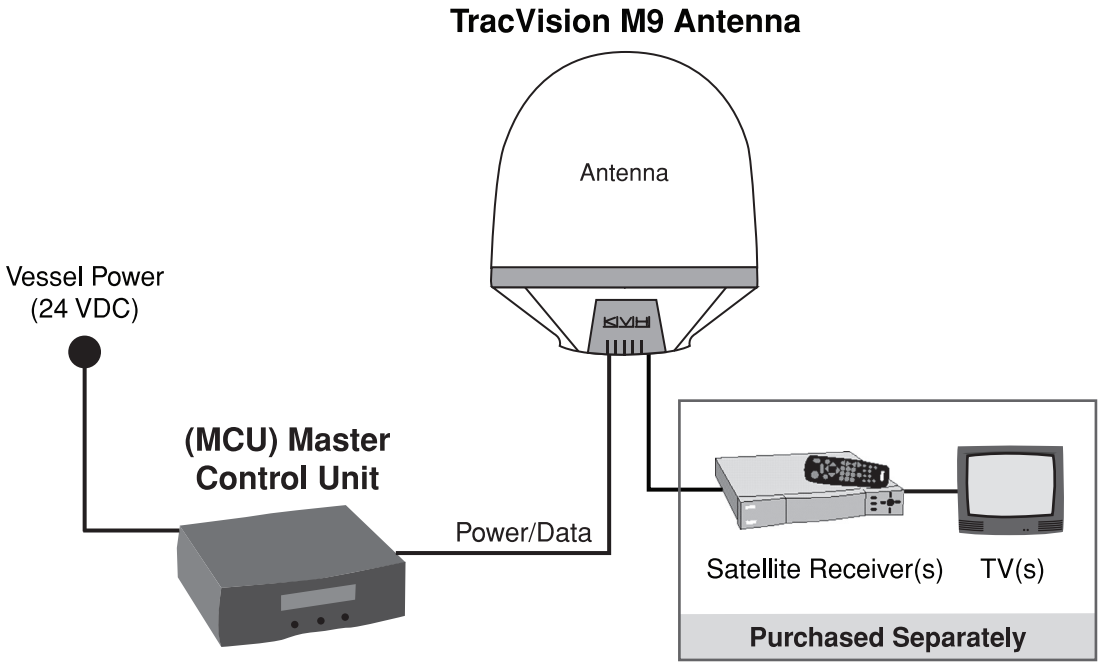
In addition to this User's Guide, the following documents are provided with your TracVision system:

Document	Description
Installation Guide	Complete product installation instructions
Product Registration Form	Details on registering the product
Warranty Statement	Warranty terms and conditions
Contents List	List of every part supplied in the kit

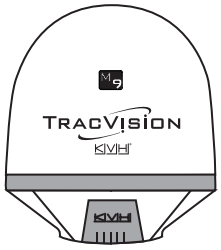
System Overview

Your TracVision system is a state-of-the-art, actively stabilized antenna system that delivers live satellite TV to your vessel's audio/video entertainment system. A basic system is illustrated below. Wiring diagrams are provided in *"Appendix C" on page 61*.

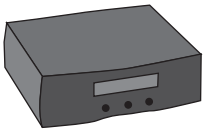
Figure 1-2 TracVision System Diagram (Basic Installation)



System Components



Antenna Unit
The antenna unit houses the antenna positioning mechanism, GPS, LNB (low noise block), and control elements within a radome. Weathertight connectors join the power, signal, and control cabling from the belowdecks units.



MCU (Master Control Unit)
The MCU is the system's user interface, providing access to the system and its functions through an LCD and three buttons. The MCU also serves as the vessel's junction box, allowing the system to use vessel power and supply and receive data to/from the TracVision M9.

System Features

Your TracVision M9 system uses integrated DVB® technology to quickly acquire and track the correct satellite, switch between satellites, and send TV signals to the receiver. The system includes a GPS sensor, ensuring that the system acquires your selected satellite in the shortest time possible.

In-motion Tracking

The TracVision M9 system uses a state-of-the-art actively stabilized antenna system. Once the satellite is acquired, the system's internal gyros continuously measure the heading, pitch, and roll of your vessel and send commands to the antenna motors, keeping the antenna pointed at the satellite at all times - even while you're on the move!

Dual-satellite Tracking Capability

Your TracVision M9 is capable of tracking two selected satellites, as long as the antenna is located within the selected satellites' coverage area. During installation, your TracVision system should have been set up to track your desired satellites, allowing you to switch between your selected satellites quickly and easily.

Automatic Skew Adjustment (Linear Version Only)

When you change location or switch satellites, the TracVision M9 automatically adjusts the LNB skew for the selected satellite.

Satellite Library

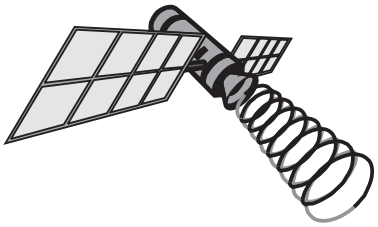
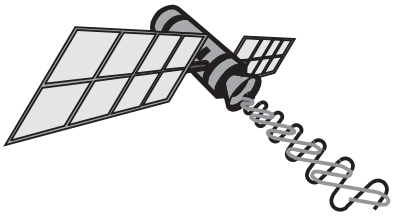
The TracVision M9 includes a pre-programmed satellite library of the most popular satellite services, offering a wide variety of satellite services to choose from. Using a PC, you can also add up to two additional satellites of your choice to the satellite library.

TIP: *For complete information on the satellite library, see* ***"Setting the MCU to Track Different Satellites" on page 23***.

Circular and Linear Versions

Your TracVision system is configured for either circularly polarized satellite signals (North America) or linearly polarized satellite signals (Europe or Latin America). *Figure 1-3* illustrates the difference between these two polarizations.

Figure 1-3 Polarizations of Satellite Signals

Circular	Linear
	
Signals transmitted in two "corkscrew" patterns, one running clockwise and one running counter-clockwise	Signals transmitted in vertical and horizontal "waves" offset exactly 90° from each other

2. Operation

This chapter explains everything you need to know to operate the TracVision system.

Contents

Receiving Satellite TV Signals 13

Turning the System On/Off 14

Changing Channels and Switching Between Satellites..... 15

Product Care..... 17

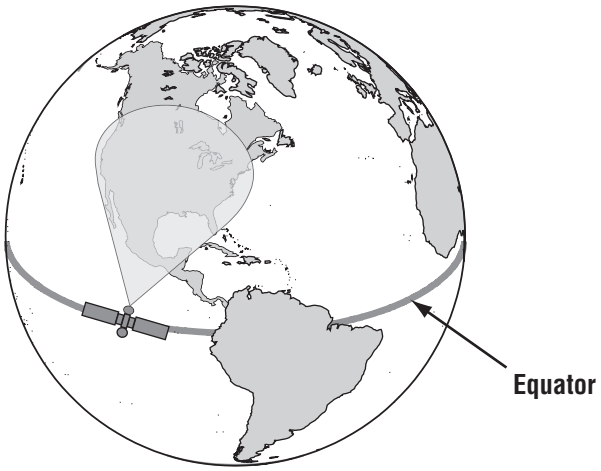
2

Receiving Satellite TV Signals

Television satellites are located in fixed positions above the Earth's equator and beam TV signals down to certain regions of the planet (not worldwide). To receive TV signals from a satellite, you must be located within that satellite's unique coverage area.

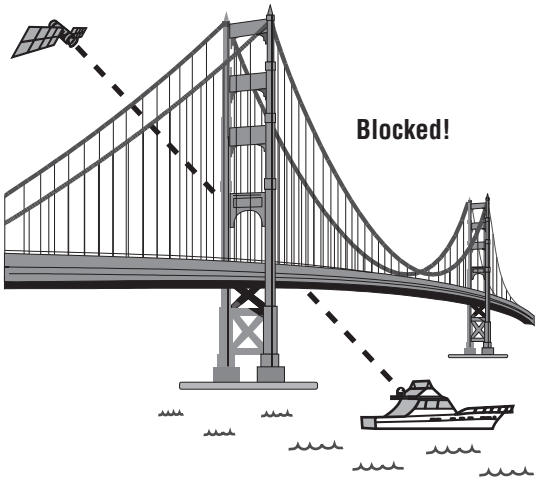
TIP: *For your convenience, KVH provides links to several websites that offer satellite coverage information. Simply visit our website at* ***www.kvh.com/footprint****.*

Figure 2-1 Location and Coverage Area of DIRECTV 101 Satellite



In addition, since TV satellites are located above the equator, the TracVision antenna must have a clear view of the sky to receive satellite TV signals. Anything that stands between the antenna and the satellite can block the signal, resulting in lost reception. Common causes of blockage include trees, buildings, and bridges. Heavy rain, ice, or snow might also temporarily interrupt satellite signals.

Figure 2-2 Example of Satellite Blockage



Turning the System On/Off

Since power to the antenna is controlled by the MCU, you can turn the antenna on or off by applying/removing power to the MCU.

Turning On the System

Follow the steps below to turn on your TracVision system.

1. Make sure the antenna has a clear view of the sky.
2. Turn on your satellite TV receiver and TV.

> ***IMPORTANT!***
>
> Avoid turning the vessel or changing channels for one minute after turning on the system.

3. Apply operating power to the MCU

   TIP: *When operating power is applied to the MCU, the MCU initiates a startup sequence. The screen updates as diagnostic tests are performed.*

4. Wait one minute for system startup. The MCU will display the Tracking Satellite screen after system testing is complete.

Figure 2-3 Tracking Satellite Screen

Turning Off the System

Follow the steps below to turn off your TracVision system.

1. Remove operating power from the MCU.
2. Turn off your satellite TV receiver and TV.

Changing Channels and Switching Between Satellites

During installation, your TracVision system should have been set up to track the satellite(s) of your choice and the channel guides for your selected satellite service should have been downloaded. Your TracVision system is programmed to track either of two satellites, stored in memory as Satellite A and Satellite B.

IMPORTANT!

(Linear systems only) To ensure proper operation, the receiver(s) must be set up for the same satellites, and in the same order, they are set up in the antenna:

Antenna Satellite	Receiver Satellite	DiSEqC Setting
Sat. A	Alternative 1 or A	DiSEqC 1
Sat. B	Alternative 2 or B	DiSEqC 2

Since some channels might be located on another satellite, changing channels might require switching to the second selected satellite. Most TracVision M9 configurations allow automatic switching between the selected satellites by simply using the primary receiver's remote control.

NOTE: *TracVision M9 configurations with a multiswitch installed require using the MCU to change satellites.*

NOTE: *At this time, DISH Network supports only the standard-definition model 311 receiver for mobile use. All other receiver models have been designated for home use only. DISH Network subscribers must use the MCU to change satellites.*

TIP: *The primary receiver is the receiver connected to the antenna's RF1 connector. The primary receiver controls satellite selection; all other receivers can only receive channels carried on the satellite selected by the primary receiver.*

Using the Receiver Remote Control to Switch Between Satellites

Most TracVision M9 system configurations allow automatic satellite switching. When automatic switching is enabled, satellite switching occurs automatically while the user changes channels using the receiver's remote control. You can also use the MCU to manually switch between your selected pair of satellites with a single button press.

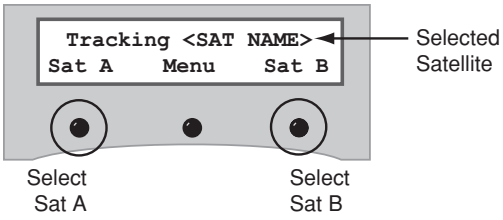
Using the MCU to Switch Between Satellites

You can switch between satellites using the MCU by pressing a single button. Follow the steps below to switch to the second satellite.

NOTE: *If you use the MCU to manually switch satellites, automatic satellite switching is disabled until the system is restarted. For more information on restarting the system, see* ***"Restarting the Antenna" on page 27****.*

1. Ensure the Tracking Satellite screen is displayed.

Figure 2-4 Tracking Satellite Screen



2. Press the appropriate MCU button (see above) to switch to the second satellite.
3. The antenna shifts to track the second satellite. Wait for the Tracking Satellite screen to reappear with the name of the second satellite displayed.

Product Care

Please consider the following antenna care guidelines for maintaining peak performance:

- Periodically wash the exterior of the antenna dome with fresh water and mild detergent. Avoid harsh cleansers and volatile solvents (such as acetone) and do not spray the dome directly with high-pressure water.

- If you wish to paint the dome, use only non-metallic automotive paint without a primer coat. Any paint that contains metal will block satellite signals and impair reception.

3. Settings

This chapter explains system settings and how to modify them using the MCU.

Contents

Changing the Sleep Mode Setting 21
Changing the Instant On Setting..... 22
Setting the MCU to Track Different Satellites..... 23
Adjusting Display Brightness..... 26
Restarting the Antenna..... 27
Manually Setting Latitude and Longitude..... 28

3

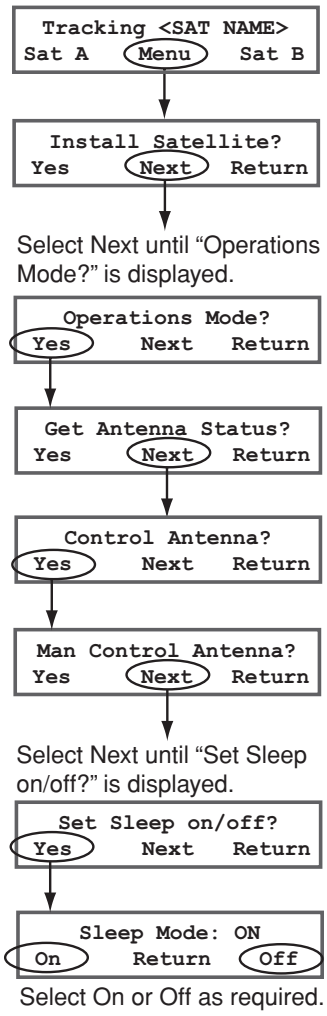
Changing the Sleep Mode Setting

When the vessel has come to a stop and holds its position for one minute (e.g., at a dock), the antenna unit enters Sleep Mode, which locks the antenna in place to conserve power. As soon as the vessel moves beyond a 1° - 2° window or the signal level changes significantly, Sleep Mode automatically turns off and the system begins tracking the satellite again.

KVH recognizes that some customers might not want to take advantage of this convenient feature. In this case, it is possible to disable Sleep Mode.

Use the flowchart in *Figure 3-1* if you wish to disable Sleep Mode, or if you wish to restore the original Sleep Mode setting.

Figure 3-1 Setting Sleep Mode On/Off



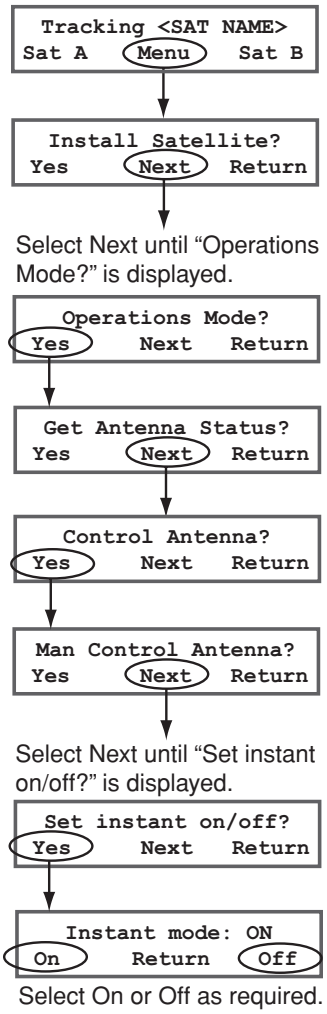
Changing the Instant On Setting

When Instant On is enabled, the antenna can immediately receive signals if the vessel has not moved since the antenna was last shut off. However, if the system is turned off, and then the vessel moves after last acquiring the satellite via Instant On, the antenna will undergo its standard initialization process once it is turned back on. This results in a brief delay.

TIP: *The default Instant On setting is off.*

Use the flowchart in ***Figure 3-2*** if you wish to enable Instant On, or if you wish to restore the original setting.

Figure 3-2 Instant On/Instant Off



Setting the MCU to Track Different Satellites

You can change which satellites your TracVision M9 system tracks by choosing up to two satellites from the appropriate satellite library (your TracVision M9 system is configured for either circular satellite reception or linear satellite reception).

NOTE: *If the satellite you wish to track is not listed, you can use a PC to add one or two special user-defined satellites. See* ***"Appendix B" on page 51*** *for details.*

TIP: *Be sure to only install satellites that your TracVision M9 can track in your geographic location. For your convenience, KVH provides links to several websites that offer satellite coverage information. Simply visit our website at* ***www.kvh.com/footprint****.*

Figure 3-3 Circular Satellite Library

Satellite Service	Satellite Location	Installation Name
ASIASAT 4	122.2° E	ASIASAT*
DIRECTV	72.0° W	DSS_72
	101.0° W	DSS_101
	110.0° W	DSS_110
	119.0° W	DSS_119
DIRECTV Latin America	95.0° W	GALAXY3CN*
DISH Network	61.5° W	ECHO_61
	110.0° W	ECHO_110
	119.0° W	ECHO_119
	148.0° W	ECHO_148
ExpressVu	82.0° W	EXPRESSVU
	91.0° W	EXPRESSTV

***NOTE:** Reception of these satellites requires additional hardware. Please contact your local KVH-authorized dealer or KVH Technical Support for details.*

Figure 3-4 Linear Satellite Library

Satellite Location	Installation Name
26.0° E	ARABSAT
19.2° E	ASTRA1
28.2° E	ASTRA2N
28.2° E	ASTRA2S
7.0° E	EUTEL_W3A
30.0° W	HISPASAT
13.0° E	HOTBIRD
13.0° E	HOTBIRDWB
7.0° W	NILESAT
160.0° E	OPTUS_B1*
156.0° E	OPTUS_C1
58.0°W	PAS_9
110.5° E	SINOSAT*
5.0° E	SIRIUS
0.8° W	THOR
42.0° E	TURKSAT1C

***NOTE:** Reception of these satellites requires additional hardware. Please contact your local KVH-authorized dealer or KVH Technical Support for details.*

Programming New Satellites to be Tracked

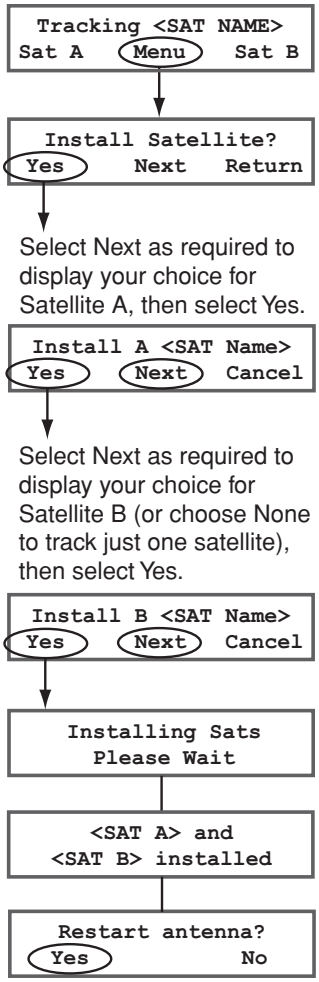
This section explains how to program the TracVision system to track different satellites using the MCU. Use the flowchart in *Figure 3-5* to install satellites using the ADCU. You can also use a PC to program the system to track different satellites.

IMPORTANT!

(Linear systems only) To ensure proper operation, the receiver(s) must be set up for the same satellites, and in the same order, they are set up in the antenna:

Antenna Satellite	Receiver Satellite	DiSEqC Setting
Sat. A	Alternative 1 or A	DiSEqC 1
Sat. B	Alternative 2 or B	DiSEqC 2

Figure 3-5 Programming New Satellites to be Tracked

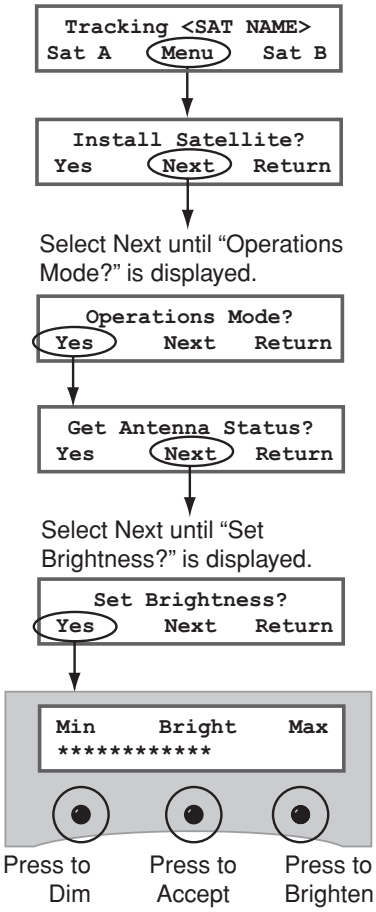

Tracking <SAT NAME>
Sat A Menu Sat B
Install Satellite?
Yes Next Return
Select Next as required to display your choice for Satellite A, then select Yes.
Install A <SAT Name>
Yes Next Cancel
Select Next as required to display your choice for Satellite B (or choose None to track just one satellite), then select Yes.
Install B <SAT Name>
Yes Next Cancel
Installing Sats
Please Wait
<SAT A> and
<SAT B> installed
Restart antenna?
Yes No

Adjusting Display Brightness

The MCU display brightness can be adjusted to suit your preferences.

Use the flowchart in *Figure 3-6* if you wish to adjust the display brightness, or if you wish to restore the original brightness setting.

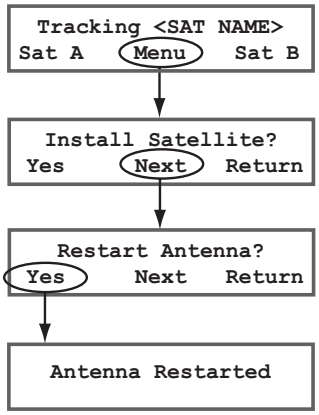
Figure 3-6 Setting Display Brightness



Restarting the Antenna

Use the flowchart in *Figure 3-7* if you wish to restart the antenna.

Figure 3-7 Restarting the Antenna



Manually Setting Latitude and Longitude

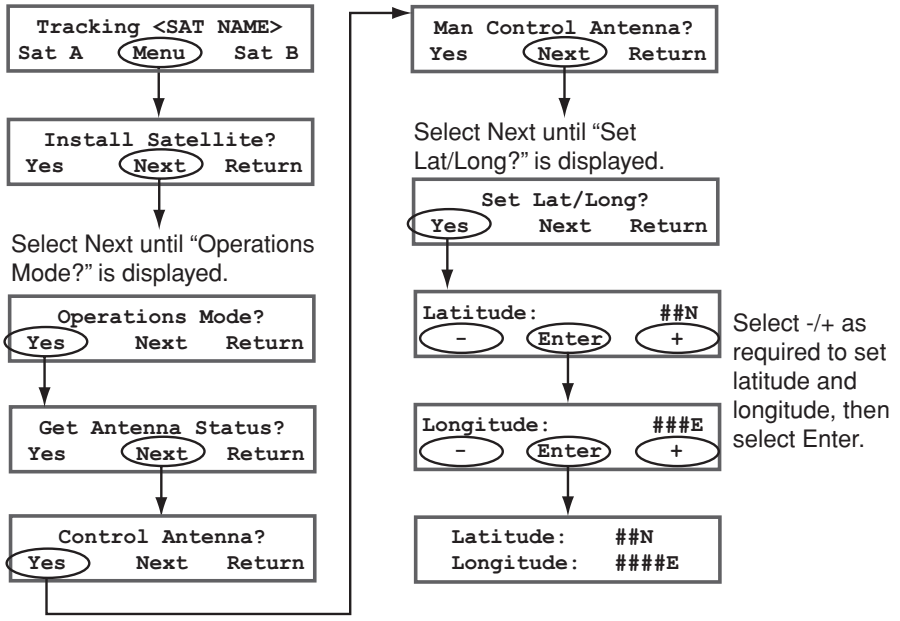
If the GPS is blocked or unavailable, you can manually set the vessel's latitude and longitude data to ensure that the installed satellites are viewable, as well as allow the system to set several internal parameters.

Use the flowchart in ***Figure 3-8*** if you wish to manually set the latitude and longitude.

NOTE: *If GPS is providing valid position data to the antenna, manual entry of the vessel's latitude and longitude data is not permitted.*

TIP: *If the "Lat/Long not valid for Sat Pair" message appears, recheck and re-enter your installed satellites.*

Figure 3-8 Manually Setting the Latitude and Longitude



4. Troubleshooting

This chapter identifies potential basic problems along with their possible causes and solutions. It also explains how to get technical support.

Contents

Four Simple Checks..... 31
Troubleshooting Matrix..... 32
Causes and Remedies for Operational Issues 33
Technical Support..... 37
Field Replaceable Units 38

Four Simple Checks

If you are experiencing a problem receiving satellite TV with your TracVision system, perform the four simple checks below.

TIP: *You can also try resetting the satellite TV receiver. Turn off and unplug the receiver, wait one minute, then plug it back in and turn it back on.*

Can the antenna see the satellite?

The antenna requires an unobstructed view of the sky to receive satellite TV signals. Common causes of blockage include trees, buildings, bridges, and mountains.

Is there excessive dirt or moisture on the antenna dome?

Dirt buildup or moisture on the dome can reduce satellite reception. Clean the exterior of the dome periodically.

Is it raining heavily?

Heavy rain or snow can weaken satellite TV signals. Reception should improve once the inclement weather subsides.

Is everything turned on and connected properly?

Make sure your TV and receiver are both turned on and set up for the satellite input. Finally, check any connecting cables to ensure none have come loose.

Troubleshooting Matrix

The troubleshooting matrix identifies potential operational symptoms and their causes and remedies. *"Causes and Remedies for Operational Issues" on page 33* contains detailed information on the causes and remedies listed below.

Figure 4-1 Troubleshooting Matrix

SYMPTOM / CAUSES AND REMEDIES	Receiver fault or improper receiver configuration	Satellite coverage issue	Satellite signal blocked	Radar interference	Satellite frequency data changed	Vessel turning during startup	Insufficient power	Improper wiring	Loose RF connectors	Type of multiswitch used	Cable unwrap
Antenna non-functional							x	x	x		
Antenna not switching satellites	x	x	x				x	x	x	x	
No picture on TV set	x	x	x	x					x	x	
Certain channels do not work	x	x	x		x		x	x	x		
Intermittent picture for short intervals		x	x	x		x			x	x	x
System works at dock but not on the move			x								
System will not find satellite	x	x	x	x	x	x	x	x	x	x	
Snowy television picture	x						x	x	x		
Pixelating television picture	x		x	x			x	x	x		

Causes and Remedies for Operational Issues

This section addresses the most common operational issues that can affect the performance of the TracVision M9. If your TracVision system requires service, you can visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit *www.kvh.com/wheretogetservice*.

Receiver Fault or Improper Receiver Configuration

Receiver Fault

Your satellite TV receiver might be set up incorrectly or defective. First check the receiver's configuration to ensure it is set up for the desired programming. In the case of a faulty receiver, refer to your selected receiver's user manual for service and warranty information.

Improper Receiver Configuration (Linear Systems Only)

To ensure proper operation, the receiver(s) must be set up for the same satellites, and in the same order, they are set up in the antenna:

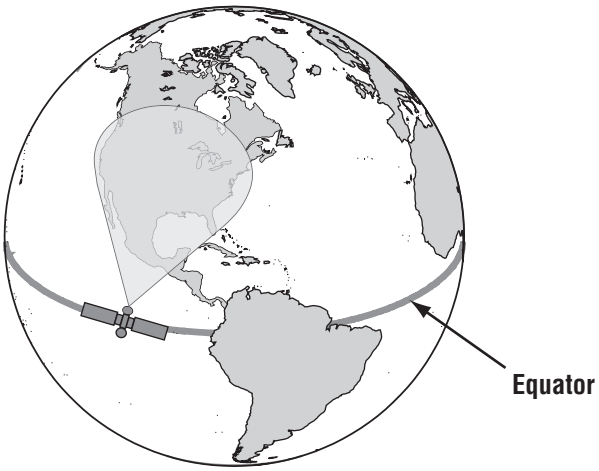
Antenna Satellite	Receiver Satellite	DiSEqC Setting
Sat. A	Alternative 1 or A	DiSEqC 1
Sat. B	Alternative 2 or B	DiSEqC 2

Satellite Coverage Issue

Television satellites are located in fixed positions above the Earth's equator and beam TV signals down to certain regions of the planet (not worldwide). To receive TV signals from a satellite, you must be located within that satellite's unique coverage area.

TIP: *For your convenience, KVH provides links to several websites that offer satellite coverage information. Simply visit our website at* ***www.kvh.com/footprint****.*

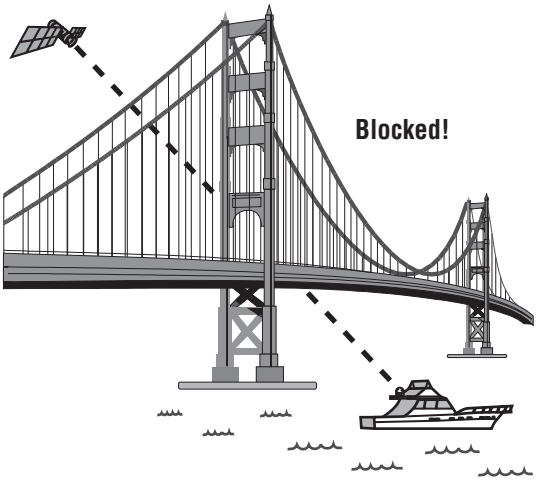
Figure 4-2 Location and Coverage Area of DIRECTV 101 Satellite



Satellite Signal Blocked

Since TV satellites are located above the equator, the TracVision antenna must have a clear view of the sky to receive satellite TV signals. Anything that stands between the antenna and the satellite can block the signal, resulting in lost reception. Common causes of blockage include trees, buildings, and bridges. Heavy rain, ice, or snow might also temporarily interrupt satellite signals.

Figure 4-3 Example of Satellite Blockage



Radar Interference

The TracVision M9 antenna must be kept out of line with nearby radars, as their energy levels might overload the antenna's front-end circuits. Refer to the *TracVision M9 Installation Guide* for details or visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit ***www.kvh.com/wheretogetservice***.

Satellite Frequency Data Changed

If some channels work, while one or more other channels do not, or if the antenna cannot find the selected satellite, the satellite's frequency data might have changed. You can visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit ***www.kvh.com/wheretogetservice***.

Vessel Turning During Startup

If the vessel turns during the first minute after startup, the gyro calibration that occurs during startup will be faulty. This might cause the TracVision M9 to track improperly. To solve this problem, simply turn off the TracVision M9 system for at least ten seconds. Then turn on the TracVision system, ensuring the vessel is either motionless or traveling in a straight line for the first minute after startup.

Insufficient Power

If the power cable to the antenna unit is more than 50 ft (15 m) long, the power level can decrease over the course of the cable, resulting in a voltage level at the antenna that is a too low to power the system. Refer to the *TracVision M9 Installation Guide* for details on supplying adequate power to the antenna or visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit ***www.kvh.com/wheretogetservice***.

Improper Wiring

If the system has been improperly wired, the antenna will not operate correctly. Refer to the *TracVision M9 Installation Guide* for complete system wiring information or visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit ***www.kvh.com/wheretogetservice***.

Loose RF Connectors

KVH recommends periodically checking the antenna unit's cable connections. A loose RF connector can reduce signal quality or prevent automatic satellite switching using the receiver's remote control. Refer to the *TracVision M9 Installation Guide* for complete system wiring information or visit any KVH-authorized dealer or distributor for assistance. To find a KVH-authorized dealer near you, visit ***www.kvh.com/wheretogetservice***.

Type of Multiswitch Used

If your TracVision system's configuration requires a multiswitch, an active (powered) multiswitch must be used to ensure proper antenna performance. Receiver wiring diagrams are provided in ***"Appendix C" on page 61***.

Cable Unwrap

If your vessel makes several consecutive circles in the same direction, the antenna will rotate 720° before reaching the end of its internal cable. If this occurs, the system will automatically unwrap the cable by quickly rotating the antenna dish in the opposite direction. During this time, your TV picture will freeze momentarily.

Technical Support

The TracVision M9 antenna is a sophisticated electronic device; only KVH-authorized technicians have the specialized tools and expertise necessary to diagnose and repair a system fault. Therefore, if you experience any operating problem or require technical assistance, please call or visit your local authorized TracVision dealer or distributor. You can find an authorized technician near you by visiting our website at *www.kvh.com/wheretogetservice*.

If you need help finding an authorized technician, please contact KVH Technical Support:

North American, South America, Australia, New Zealand:
Phone: +1 401 847-3327
E-mail: *techs@kvh.com*

Europe, Middle East, Asia:
Phone: +45 45 160 180
E-mail: *support@kvh.dk*

Please have your antenna serial number handy before you call. For information on retrieving your antenna serial number, refer to *"Displaying the Antenna Serial Number" on page 49*.

Field Replaceable Units

If you experience any operating problem or require technical assistance, please call or visit your local authorized TracVision dealer or distributor. To find a KVH-authorized dealer near you, visit *www.kvh.com/wheretogetservice*.

Part numbers for field replaceable units (FRUs) that can be serviced in the field are listed in *Figure 4-4*. These parts can be obtained from any KVH-authorized dealer or distributor.

Figure 4-4 Field Replaceable Units (continued on next page)

Part	Part Number
Radome	02-1255-03†
MCU	02-1265
MCU rear-panel fuse, 15 amp	16-0029-15
PCB Module	72-0270
Inverter PCB	72-0271
Gyro	72-0272
Internal sensor (GPS)	72-0273
Elevation motor belt	72-0275
Elevation motor	72-0274
Skew motor belt (linear version only)	72-0277
Skew motor (linear version only)	72-0276
LNB - circular dual-output	72-0278
LNB - Galaxy circular dual-output	72-0279
LNB - linear quad-output	72-0280
LNB - linear quad-output and skew motor assembly	72-0281

†Specify color when ordering

Figure 4-4 Field Replaceable Units (continued)

Part	Part Number
Feed tube	72-0282
Antenna data/power cable, 100 ft.	32-0744-100
Ground cable, 50 ft.	32-0583-50
RF cable, 100 ft.	32-0566-100
PC data cable, 6 ft.	32-0628-06

Appendix A Advanced Settings and Functions

This appendix contains information on advanced settings and functions. This information should only be utilized by KVH-authorized technicians.

Contents

Manually Controlling the Antenna 43
Updating Satellite Frequency Data 44
Configuring Satellite Settings 46
Displaying the Software Version Information 48
Displaying the Antenna Serial Number 49
Other Advanced Settings 50

A

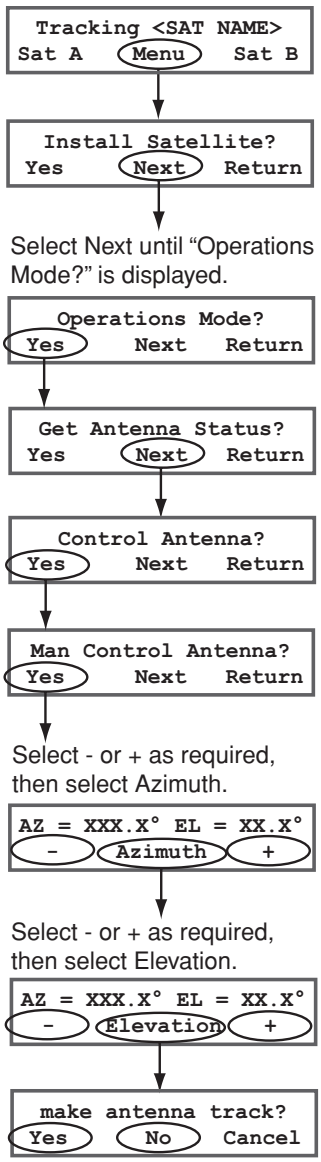
Manually Controlling the Antenna

Use the flowchart in ***Figure A-1*** if you wish to control the antenna manually.

NOTE: *If you are performing this procedure as part of the satellite frequency scan update procedure, be sure to select "NO" at the "Make Antenna Track" screen.*

TIP: *Once you have finished positioning the antenna, the system will revert to automatic control.*

Figure A-1 Manually Controlling the Antenna



Updating Satellite Frequency Data

If the antenna is unable to find a satellite, or if you are unable to receive certain channels, the satellite's frequency data might have changed. The satellite frequency scan feature allows you to update the frequency data of any satellite stored in the system's library.

With the desired satellite, band, and polarization selected, the system will automatically search for the frequency with the strongest signal. The system will then update that satellite's programmed data with the new frequency (and associated network ID) and store it in the satellite library.

You will need to enter the following information:

- Symbol rate
- FEC code

TIP: *You can find satellite information on the web at* ***www.lyngsat.com*** *or* ***www.satcodx.com*** *(neither website is affiliated with KVH).*

To update the satellite frequency data, follow the steps below.

IMPORTANT!

The vessel must remain stationary throughout this procedure.

1. Set your satellite receiver to signal meter mode. Refer to your selected receiver's user manual for details.

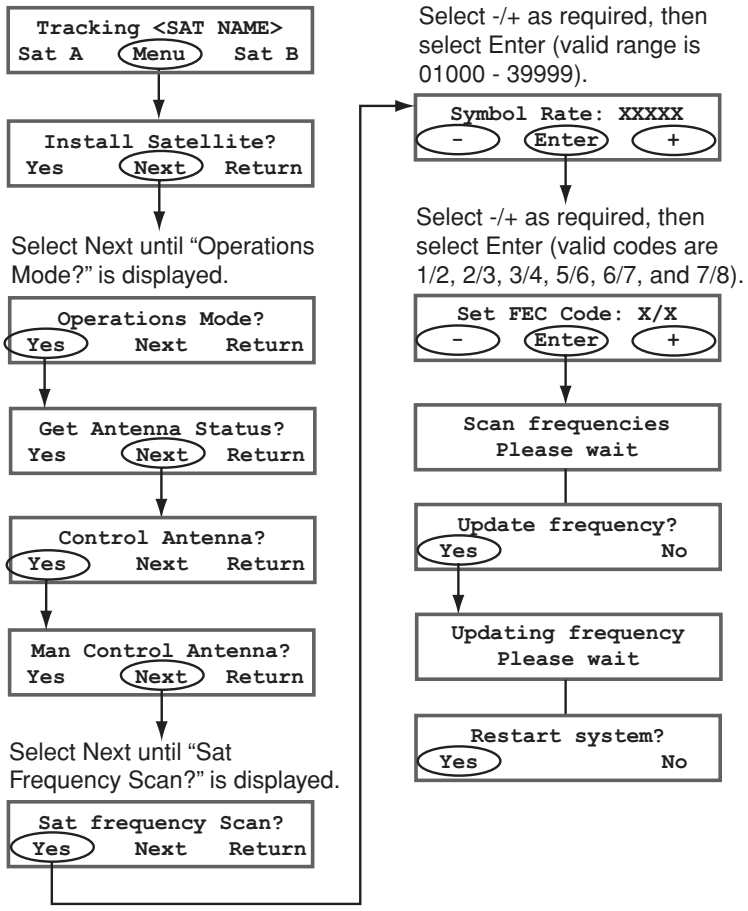
   IMPORTANT!

   Ensure that the TV signal meter indicates that you have a strong signal.

2. If the system is unable to locate the selected satellite, you can manually point the antenna. Refer to ***"Manually Controlling the Antenna" on page 43*** for details.
3. Using the receiver, select the desired polarization and band. Refer to your selected receiver's user manual for details.
4. Use the flowchart in ***Figure A-2 on page 45*** to scan the frequency data of the selected satellite.

TIP: *Scanning satellite frequencies might take up to 10 minutes.*

Figure A-2 Scanning Frequency Data



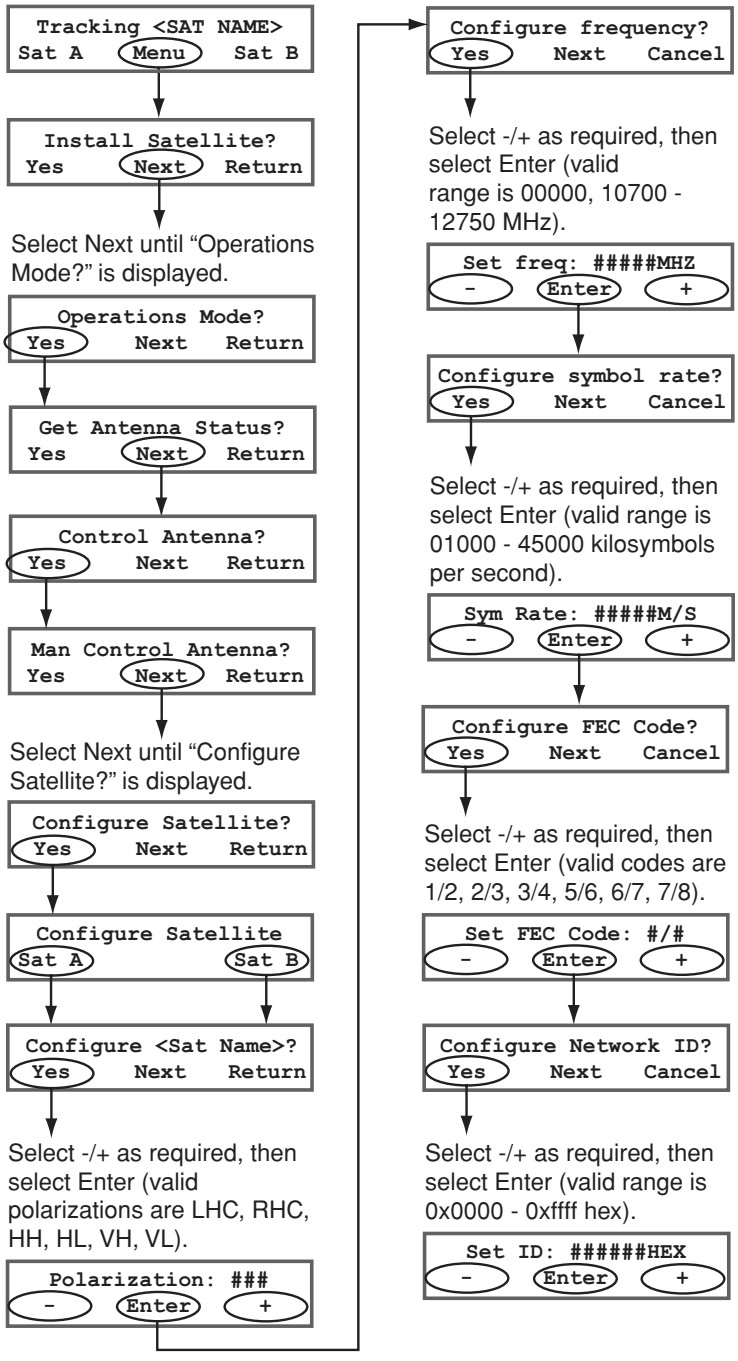
Configuring Satellite Settings

Use the flowchart in ***Figure A-3 on page 47*** to configure one of the satellites selected for tracking.

TIP: *Circular satellites use the following polarization/band combinations: right (RHC) and left (LHC). Linear satellites use the following polarization/band combinations: vertical high (VH), vertical low (VL), horizontal high (HH), and horizontal low (HL).*

TIP: *You can find satellite information on the web at* ***www.lyngsat.com*** *or* ***www.satcodx.com*** *(neither website is affiliated with KVH).*

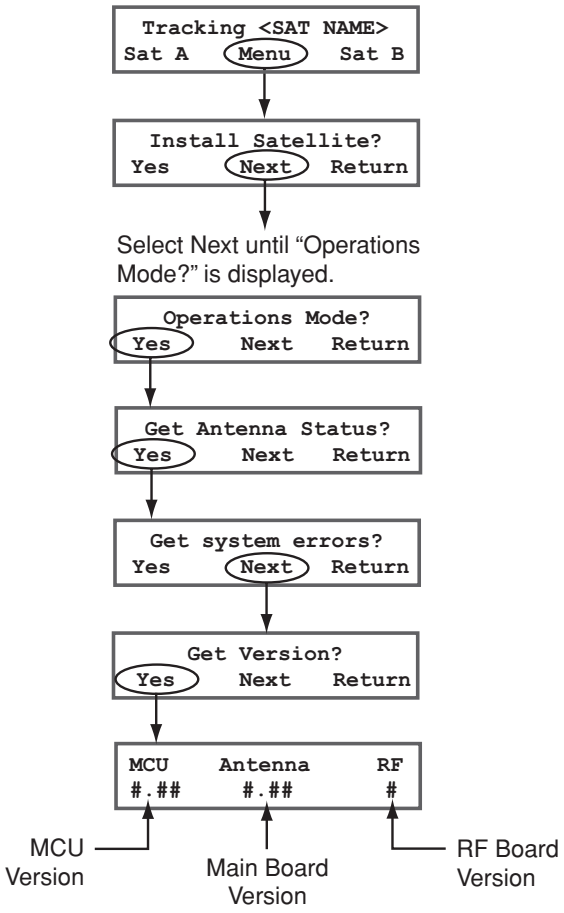
Figure A-3 Configuring Satellite Settings


Tracking <SAT NAME>
Sat A Menu Sat B
Install Satellite?
Yes Next Return
Select Next until "Operations Mode?" is displayed.
Operations Mode?
Yes Next Return
Get Antenna Status?
Yes Next Return
Control Antenna?
Yes Next Return
Man Control Antenna?
Yes Next Return
Select Next until "Configure Satellite?" is displayed.
Configure Satellite?
Yes Next Return
Configure Satellite
Sat A Sat B
Configure <Sat Name>?
Yes Next Return
Select -/+ as required, then select Enter (valid polarizations are LHC, RHC, HH, HL, VH, VL).
Polarization: ###
- Enter +
Configure frequency?
Yes Next Cancel
Select -/+ as required, then select Enter (valid range is 00000, 10700 - 12750 MHz).
Set freq: #####MHZ
- Enter +
Configure symbol rate?
Yes Next Cancel
Select -/+ as required, then select Enter (valid range is 01000 - 45000 kilosymbols per second).
Sym Rate: #####M/S
- Enter +
Configure FEC Code?
Yes Next Cancel
Select -/+ as required, then select Enter (valid codes are 1/2, 2/3, 3/4, 5/6, 6/7, 7/8).
Set FEC Code: #/#
- Enter +
Configure Network ID?
Yes Next Cancel
Select -/+ as required, then select Enter (valid range is 0x0000 - 0xffff hex).
Set ID: ######HEX
- Enter +

Displaying Software Version Information

Use the flowchart in *Figure A-4* if you wish to display software version information.

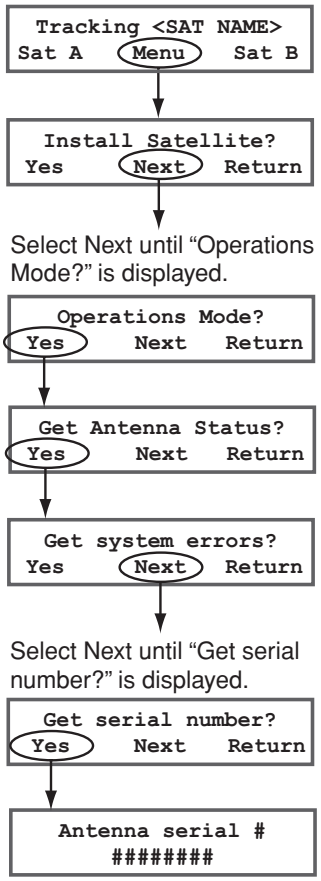
Figure A-4 Displaying Software Version Information



Displaying the Antenna Serial Number

Use the flowchart in *Figure A-5* if you wish to display the antenna serial number.

Figure A-5 Displaying Antenna Serial Number



Other Advanced Settings

Not all MCU menu options are used in this configuration. The following menu options are not used:

- Get System Errors
- Get Skew Angle
- Get Bit Error Rate
- Get Thres/Sig level
- Get State
- Upgrade Software

Appendix B Programming User-defined Satellites

This appendix explains how to program a user-defined satellite(s) into the antenna, if necessary. The TracVision M9 includes a library of common satellites that you can choose from. However, if the satellite(s) you wish to track is not listed, follow the instructions in this appendix to program your desired satellite(s). For a complete listing of satellites in the satellite library, see *"Setting the MCU to Track Different Satellites" on page 23*.

Contents

Connect a PC to the Main Flash Port 53

Programming Your User-defined Satellites 55

B

Connect a PC to the Main Flash Port

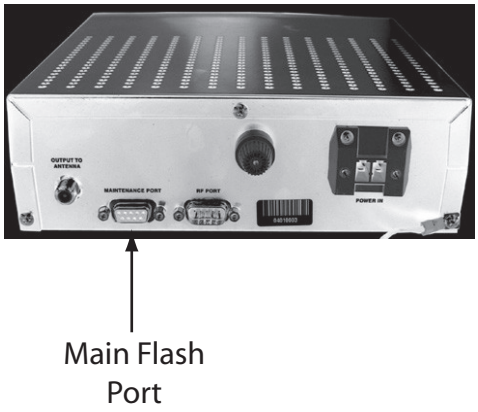
To program your user-defined satellite(s), you first need to connect a PC with Windows® HyperTerminal installed.

TIP: *If you are a KVH-authorized technician, you can use the KVH Flash Update Wizard instead of HyperTerminal. Enter commands in the wizard's "Antenna Comms" window. You do not need to flash the antenna to enter commands.*

1. Turn off the TracVision system.

2. Connect one end of a straight serial data cable to the main flash port on the back of the MCU. Connect the other end of the data cable to the serial port on your PC.

Figure B-1 Main Flash Port on MCU

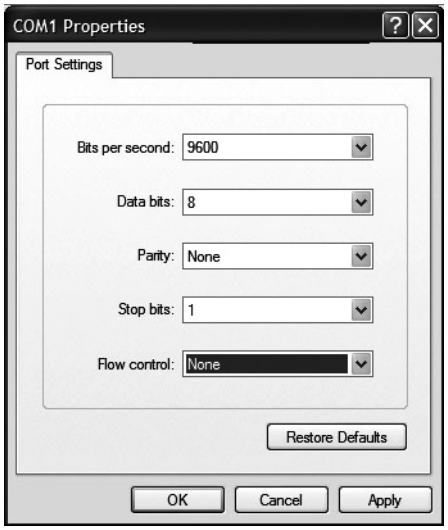


TIP: *If your computer does not have a DB9 serial COM port, you can use the following USB-to-RS232 adapters: IO Gear Part # GUC232A (visit* ***www.iogear.com****) or Belkin Part # F5U109 (visit* ***www.belkin.com****).*

3. Open HyperTerminal and establish the following settings:

   - Bits per second: 9600
   - Data bits: 8
   - Parity: None
   - Stop Bits:1
   - Flow Control: None

Figure B-2 HyperTerminal Settings



TIP: *To view characters on the screen as you type, set up HyperTerminal to echo typed characters. Select "Properties" from the File menu; select "ASCII Setup" at the Settings tab; then select "Echo typed characters locally" at the ASCII Setup window.*

4. Turn on the TracVision system.

Programming Your User-defined Satellite(s)

To configure a user-defined satellite, you will need to program the following satellite information into the antenna:

- Satellite name
- Satellite longitudinal position
- Transponder information for all applicable combinations of polarization/band:
  - Frequency
  - Symbol rate
  - FEC code
  - Network ID
  - Decoder type

TIP: *Linear satellites use the following polarization/band combinations: vertical high, vertical low, horizontal high, and horizontal low. Circular satellites use the following polarization/band combinations: right and left.*

NOTE: *You can find satellite information on the web at* ***www.lyngsat.com*** *or* ***www.satcodx.com*** *(neither website is affiliated with KVH).*

1. Connect a PC to the maintenance port, as described in *"Connect a PC to the Main Flash Port" on page 53*. Then type the following commands in the HyperTerminal window.

2. Type **HALT** then press Enter.

3. Type the following **SATCONFIG** command then press Enter:

SATCONFIG,*X*,*A*,*B*,*C*,*D*

Field	Description
X	User-defined satellite stored in antenna library (User1 = User-defined Satellite 1 or User2 = User-defined Satellite 2)
A	Longitude (0-180)
B	E (East) or W (West)
C	Decoding type (2 = DSS, 3 = DVB)
D	Polarization (L = linear) (C = circular)

4. Type **@DEBUGON** then press Enter.

5. Type the following **@SATCONFIG** command then press Enter:

@SATCONFIG,*X*,*E*,*F*,*G*,*H*,*I*,*J*,*K*

Field	Description
X	User-defined satellite stored in antenna library (User1 = User-defined Satellite 1 or User2 = User-defined Satellite 2)
E	Frequency, MHz (00000 or 10700-12700)
F	Symbol rate, kilosymbols per second (10000-45000)
G	FEC code (12, 23, 34, 56, 67, or 78)
H	Network ID, hexadecimal (0x####)
I	Polarization (V = vertical; H = horizontal; R = right; L = left)
J	LNB down conversion frequency (U = USA [11250 MHz]; L = low [9750 MHz]; H = high [10600 MHz]; G = Latin America [10500 MHz]; S = Sinosat [11300 MHz])
K	Decoding type (2 = DSS, 3 = DVB)

6a. (Linear systems only) - Repeat Step 5 for each polarization/band:

- Vertical High
- Horizontal High
- Vertical Low
- Horizontal Low

6b. (Circular systems only) - Repeat Step 5 for each polarization/band:

- Right
- Left

If your selected satellite does not have information for one or more of these transponder categories, you can enter the following defaults instead:

Transponder Data	Default Value
Frequency	00000
Symbol rate	27500
FEC code	Same value as other transponders with valid data
Network ID	0x0000

7. Type **ZAP** then press Enter. The antenna restarts. Wait one minute for system startup.

8. Refer to *"Setting the MCU to Track Different Satellites" on page 23* to select your new user-defined satellite(s) for tracking. Be sure use the following installation names for your user-defined satellite(s):

Satellite	Installation Name
User-defined Satellite 1	USER1
User-defined Satellite 2	USER2

Example - Linear Satellite

The following is an example of programming the fictional "YOURSAT 7" as the USER1 user-defined satellite.

YOURSAT 7 at 7°W, DVB decoder, linear polarization

Transponder Data	Value
Horizontal High	
Frequency	11.966 GHz
Symbol rate	27500
FEC code	3/4
Network ID	2048 (dec) = 0x0800
Vertical High	
Frequency	11.823 GHz
Symbol rate	27500
FEC code	3/4
Network ID	2048 (dec) = 0x0800
Vertical Low	
No data listed	
Horizontal Low	
No data listed	

Based on the above information, you would enter the following commands into the HyperTerminal window:

```
HALT
SATCONFIG,USER1,7,W,3,L
@DEBUGON
@SATCONFIG,A,11966,27500,34,0x0800,H,H,3
@SATCONFIG,A,11823,27500,34,0x0800,V,H,3
@SATCONFIG,A,00000,27500,34,0x0000,V,L,3
@SATCONFIG,A,00000,27500,34,0x0000,H,L,3
ZAP
```

Example - Circular Satellite

The following is an example of programming the fictional "YOURSAT 122" as the USER2 user-defined satellite.

YOURSAT 122 at 122°W, DVB decoder, circular polarization

Transponder Data	Value
Right	
Frequency	12.225 GHz
Symbol rate	20000
FEC code	5/6
Network ID	4100 (dec) = 0x1004
Left	
Frequency	12.456 GHz
Symbol rate	20000
FEC code	5/6
Network ID	4100 (dec) = 0x1004

Based on the above information, you would enter the following commands into the HyperTerminal window:

```
HALT
SATCONFIG,USER2,122,W,3,C
@DEBUGON
@SATCONFIG,B,99,12225,20000,56,0x1004,R,U,3
@SATCONFIG,B,99,12456,20000,56,0x1004,L,U,3
ZAP
```

Appendix C TracVision M9 Wiring Diagrams

This appendix provides receiver wiring diagrams for TracVision M9 configurations. Wiring diagrams vary according to system configuration. For installation instructions, refer to the *TracVision M9 Installation Guide*.

Contents

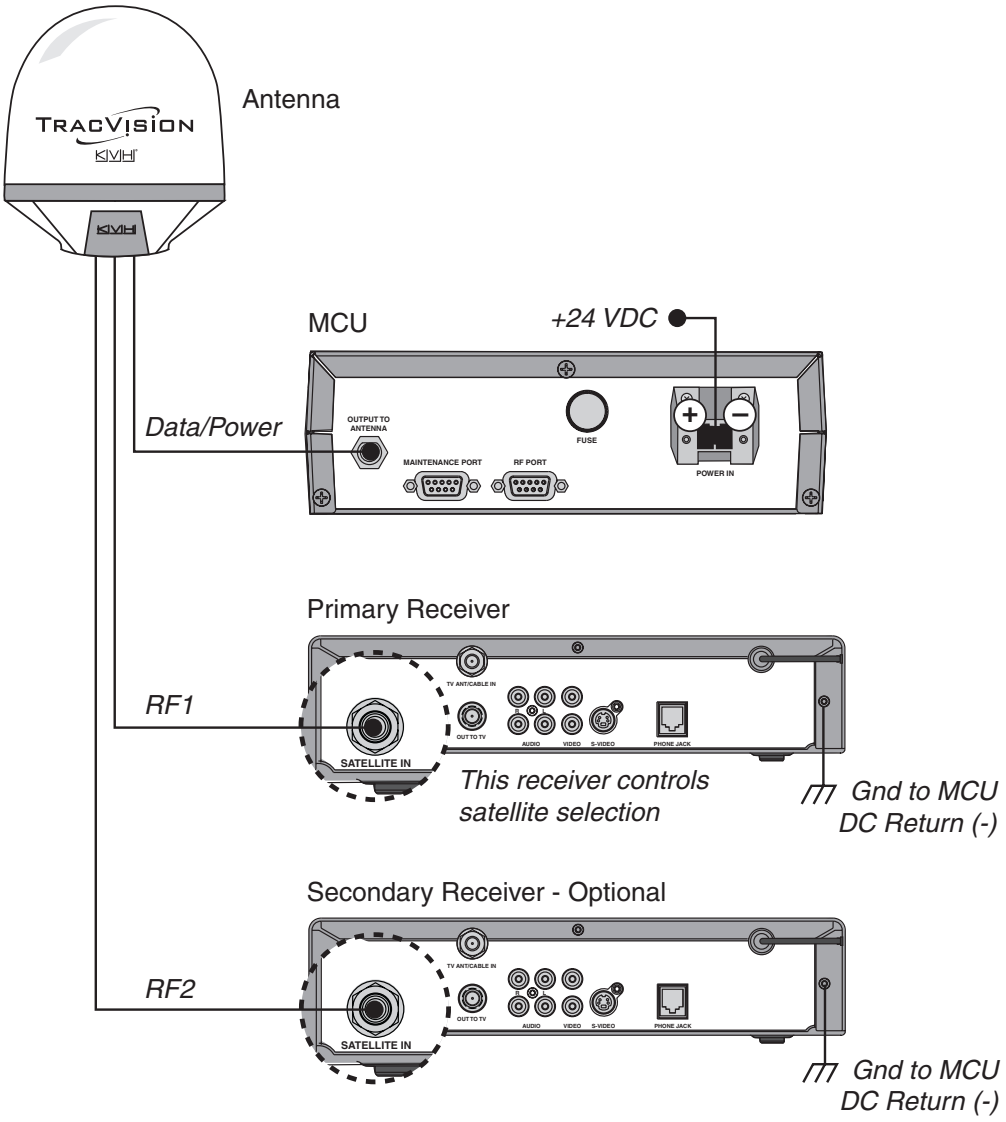
TracVision M9 Wiring Diagram for One or Two Receivers 63

TracVision M9 Wiring Diagram for Three or Four Receivers (Circular Version Only) 64

TracVision M9 Wiring Diagram for Three or Four Receivers (Linear Version Only) 65

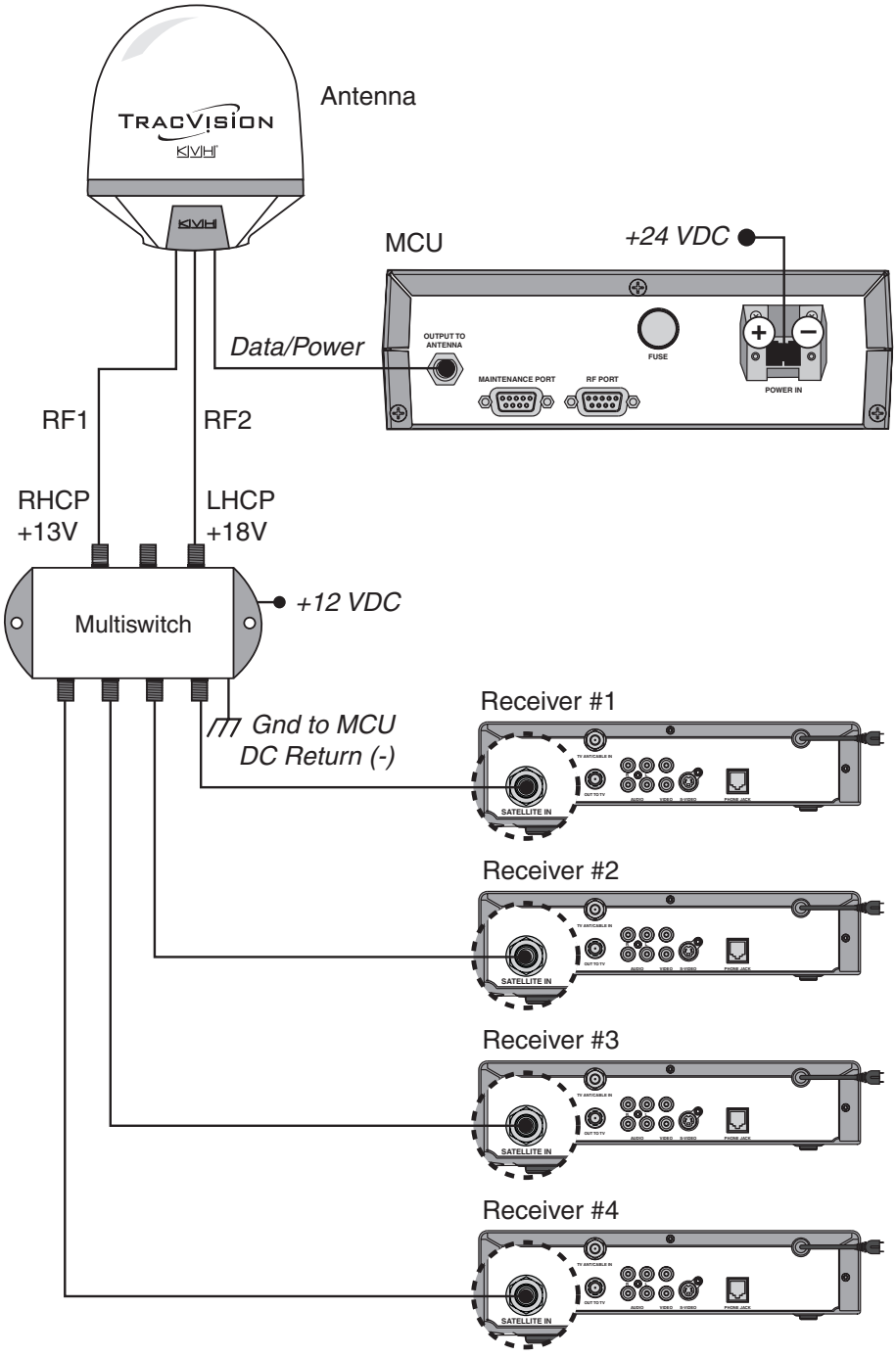
C

TracVision M9 Wiring Diagram for One or Two Receivers



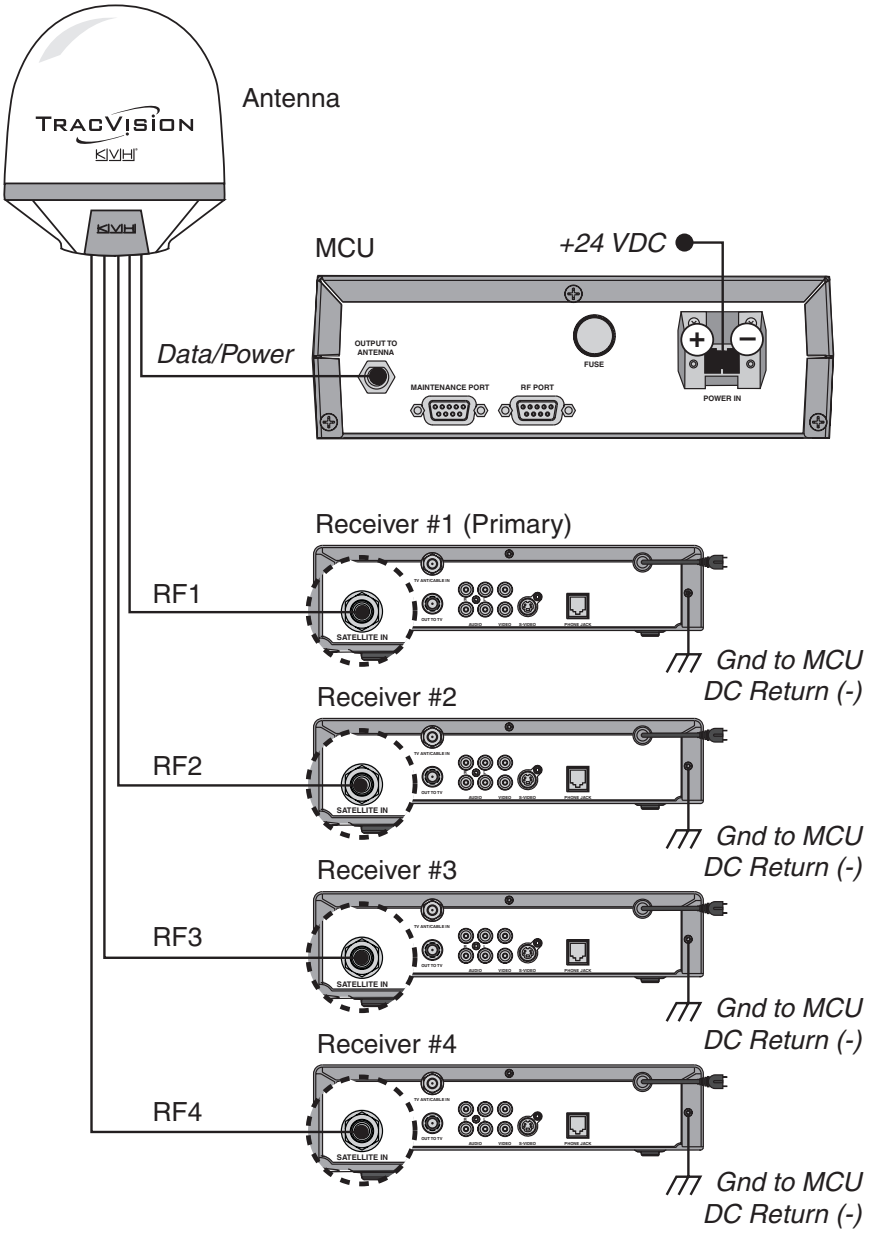
Circular Version Only

TracVision M9 Wiring Diagram for Three or Four Receivers* (Circular Version Only)



***NOTE:** This configuration requires an active (powered) multiswitch, such as Channel Master model 6314IFD. You can purchase this multiswitch from KVH (KVH P/N 19-0123). Be sure to terminate all unused output connectors with 75 ohm DC blocks (Channel Master model #7184 or equivalent).*

TracVision M9 Wiring Diagram for Three or Four Receivers (Linear Version Only)



Appendix D Recalibration

This appendix explains how to recalibrate the system. This information should only be utilized by KVH-authorized technicians.

Contents

Recalibrating the System 69

D

Recalibrating the System

During installation, the TracVision M9 should have been properly calibrated. However, if the antenna is moved or if additional equipment is installed or removed near the antenna, KVH recommends recalibrating the system. The following sections explain how to recalibrate the system.

NOTE: *This procedure does not apply to large vessels, such as tankers and large cargo ships.*

To perform this procedure, you will need to perform the following:

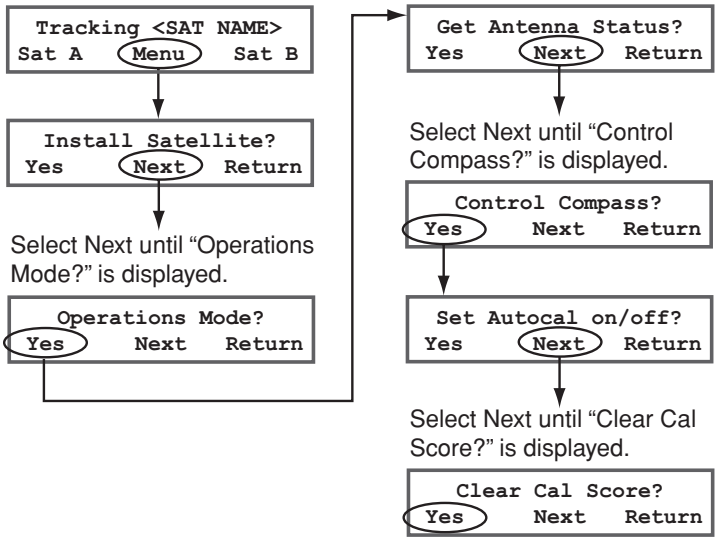
- Clear the existing calibration score
- Turn on autocalibration
- Recalibrate the system
- Verify the calibration score

Clear the Existing Calibration Score

Use the flowchart in ***Figure D-1*** to clear the existing calibration score.

NOTE: *Be sure to turn the system off after completing this procedure. Wait 10 seconds, then turn the system on.*

Figure D-1 Clearing the Existing Calibration Score

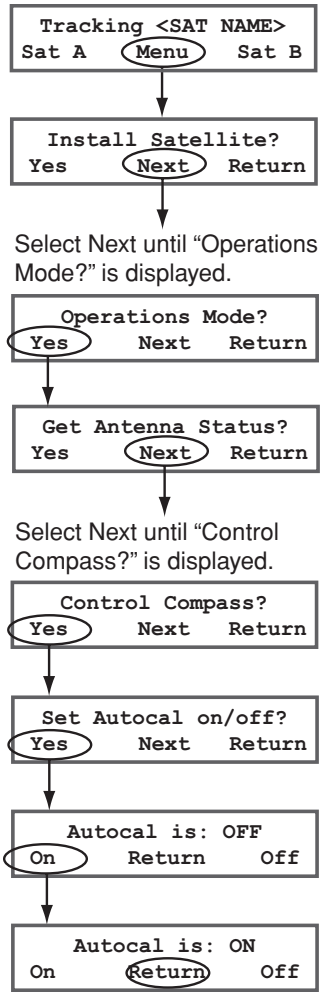


Turn On Autocalibration

Use the flowchart in *Figure D-2* to turn on autocalibration.

NOTE: *Autocalibration automatically turns off after a valid calibration score is received. For more information on interpreting the calibration score, see* *"Interpreting the Calibration Score" on page 73*.

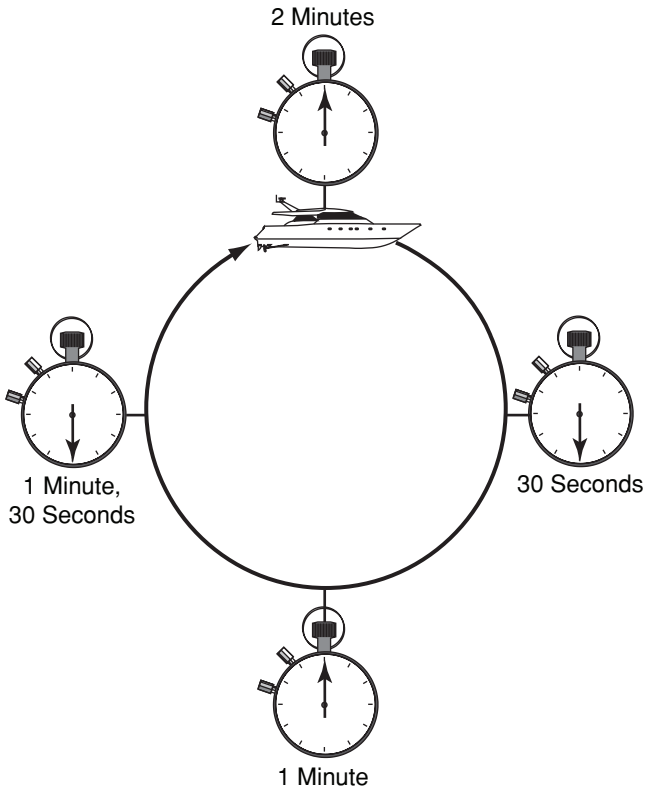
Figure D-2 Turning On Autocalibration



Recalibrate the System

1. Select a calm day and a clear area. Excessive pitching and rolling can distort calibration data.
2. Apply power to the TracVision system.
3. Write down your approximate heading. You will use this information later in this procedure.
4. Steer the vessel at a slow, steady pace through a full circle that takes at least two minutes to complete. Use the heading information that you recorded earlier to confirm that you completed a full circle (see *Figure D-3*).

Figure D-3 Timing the Calibration Circle

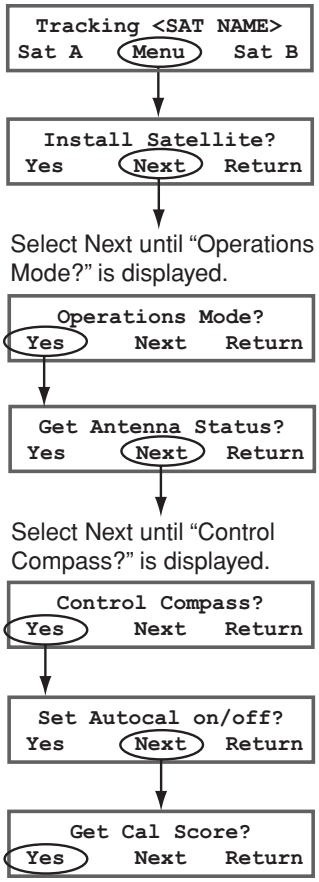


Verify the Calibration Score

This section explains how to interpret the calibration score display. Be sure to verify that the calibration yielded acceptable results. If the calibration did not yield acceptable results, you will need to restart recalibration.

Use the flowchart in *Figure D-4* to display the calibration score. For information on interpreting the calibration score, see *"Interpreting the Calibration Score" on page 73*.

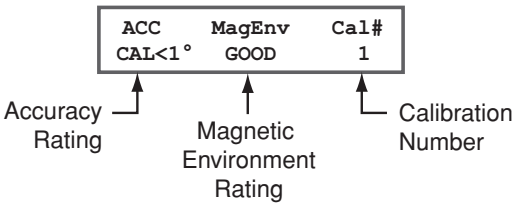
Figure D-4 Displaying the Calibration Score



Interpreting the Calibration Score

Each calibration results in a calibration score that is stored in the system's memory. The calibration score contains an accuracy rating, a magnetic environment rating, and the number of calibrations performed.

Figure D-5 Calibration Score Screen



Accuracy Rating

The accuracy rating indicates the degree of accuracy the antenna's internal sensor will provide based on the quality of the last calibration. *Figure D-6* lists the five possible accuracy rating levels.

Figure D-6 Accuracy Rating Levels

Accuracy Rating	Accuracy
<1°	Better than 1°
<2°	Better than 2°
<4°	Better than 4°
<8°	Better than 8°
BAD CAL	Recalibrate

Magnetic Environment

The magnetic environment rating (GOOD, POOR, BAD) indicates the environmental quality of the installation location. If the quality is POOR or BAD, check the area around the antenna for materials that might cause magnetic interference. Relocate the materials if possible, or relocate the antenna to a more favorable magnetic environment. Then restart recalibration.

Calibration Number

The calibration number indicates the number of times the antenna's internal sensor has been calibrated. This is primarily used to verify that a new calibration has been accepted by the system.

KVH Industries, Inc.
50 Enterprise Center Middletown, RI 02842-5279 U.S.A.
Phone: +1 401 847-3327 Fax: +1 401 849-0045
E-mail: info@kvh.com Internet: www.kvh.com

KVH Europe A/S
Kokkedal Industripark 2B 2980 Kokkedal Denmark
Phone: +45 45 160 180 Fax: +45 45 160 181
E-mail: info@kvh.dk Internet: www.kvh.com

© Copyright 2006 KVH Industries Inc.

KVH and TracVision are registered trademarks of KVH Industries Inc.